

(Post Name: Technical Assistant , Subject/Field: CS & IT , Date of Exam: 25-04-2023 ,  
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1. What is a foreign key?
  - A) A field that uniquely identifies each record in a table
  - B) A field that is used to join two tables
  - C) A field that stores a list of values
  - D) A field that contains calculated values
  
2. What is a relational database?
  - A) A database that is stored on a network
  - B) A database that is organized into tables with relationships between the tables
  - C) A database that is stored in the cloud
  - D) A database that is used for storing multimedia files
  
3. What is a transaction rollback?
  - A) The process of saving the results of a transaction to the database
  - B) The process of undoing all the changes made by a transaction
  - C) The process of committing all the changes made by a transaction
  - D) The process of starting a new transaction
  
4. In DBMS, data is stored in \_\_\_\_\_ format.
  - A) Audio
  - B) Graph
  - C) Table
  - D) Image
  
5. Which command is used to remove a relation from an SQL?
  - A) Drop table
  - B) Delete
  - C) Purge
  - D) Remove
  
6. Which of the following condition is satisfied for database transaction?
  - A) Transactions are collections of related database operations that must be performed as a single logical unit
  - B) Transactions cannot be rolled back if they have already been committed
  - C) Transactions do not ensure the consistency and durability of data in the database
  - D) Transactions are not used in modern database management systems
  
7. In which of the following gates, input and output both are at least is 1?
  - A) NOR
  - B) AND
  - C) OR
  - D) NAND
  
8. \_\_\_\_\_ half-adder and \_\_\_\_\_ full-adder required to add 16-bit numbers.
  - A) 8 half-adders, 8 full-adders
  - B) 1 half-adder, 15 full-adders
  - C) 16 half-adders, 0 full-adders
  - D) 4 half-adders, 12 full-adders
  
9. Which of the following option is not equal to  $X'$  ?
  - A)  $X \text{ NAND } X$
  - B)  $X \text{ NOR } X$
  - C)  $X \text{ NAND } 0$
  - D)  $X \text{ NOR } 1$

10. Which of the condition is satisfied for demultiplexer?  
A) Route the data from single input to one of many outputs  
B) Route the data from single input to single output  
C) Select data from several inputs and route it to many output  
D) Select data from several inputs and route it to single output
11. Which logic gates is used for S-R flip flop?  
A) AND or OR gates  
B) NOR or NAND gates  
C) Both of above  
D) EEPRAM
12. Conversion of hexadecimal number A4E to its octal number equivalent is  
A) 5116  
B) 6115  
C) 2638  
D) 10414
13. Which type of memories must be refreshed continually?  
A) Static RAM  
B) Dynamic RAM  
C) EPROM  
D) None of the Above
14. When an instruction itself contains the operand (data) rather than the address of the operand, the technique is known as \_\_\_\_\_ addressing.  
A) Direct  
B) Indirect  
C) Immediate  
D) None of above
15. In 8086 processor the size of prefetch queue is \_\_\_\_\_ bytes.  
A) 6  
B) 8  
C) 12  
D) 10
16. The minimum time delay between two successive memories read operations is \_\_\_\_\_.  
A) Latency  
B) Cycle time  
C) Delay  
D) None of the Above
17. Which of the following is a primitive data type in Java?  
A) String  
B) class  
C) Boolean  
D) Object
18. What is the output of the following C code?  

```
int i = 5;  
printf("%d", ++i);
```

  
A) 4  
B) 6  
C) 5  
D) 7

19. Which of the following is a valid way to declare a two-dimensional array in C++?
- A) `int[3][3] arr;`
  - B) `int arr[3, 3];`
  - C) `int arr[3][3];`
  - D) `int arr[][] = {1,2,3}, {4,5,6};`
20. Which of the following is not a valid way to define a constant in C?
- A) `#define PI 3.14`
  - B) `const float PI = 3.14;`
  - C) `static const float PI = 3.14;`
  - D) `constexpr float PI = 3.14;`
21. Which of the following is a linear data structure?
- A) Tree
  - B) Graph
  - C) Heap
  - D) Stack
22. What is the time complexity of searching for an element in a sorted array using binary search?
- A)  $O(1)$
  - B)  $O(n)$
  - C)  $O(\log n)$
  - D)  $O(n \log n)$
23. In data structure, complex relationship between the nodes can be represented by:
- A) arrays
  - B) linked lists
  - C) trees
  - D) Graphs
24. The best-case complexity of Quick sort is represented by \_\_\_\_\_.
- A)  $O(n \log n)$
  - B)  $O(\log n)$
  - C)  $O(n)$
  - D)  $O(n^2)$
25. What is the advantage of bubble sort over other sorting techniques?
- A) It is faster
  - B) Consumes less memory
  - C) Detects whether the input is already sorted
  - D) All of the mentioned
26. The efficiency of an algorithm can be measured through
- A) Processor and memory
  - B) Complexity and capacity
  - C) Time and space
  - D) Data and space
27. What is the worst case in linear search?
- A) Item is somewhere in the middle of the array
  - B) Item is not in the array at all
  - C) Item is the last element in the array
  - D) Item is the last element in the array or is not there at all

28. Which of the following is an example of a greedy algorithm?  
 A) Dijkstra's shortest path algorithm  
 B) Prim's minimum spanning tree algorithm  
 C) Kruskal's minimum spanning tree algorithm  
 D) Huffman encoding algorithm
29. What is the main difference between Python and R for data analytics?  
 A) Python is faster and more efficient than R  
 B) R has better data visualization capabilities than Python  
 C) Python is a general-purpose language while R is specifically designed for statistical computing and graphics  
 D) R has better machine learning capabilities than Python
30. Which of the following is not used for data visualization library in Python?  
 A) ggplot2  
 B) Matplotlib  
 C) Seaborn  
 D) NumPy
31. What is the purpose of NumPy in Python?  
 A) NumPy is a library used for data manipulation and analysis  
 B) NumPy is a library used for numerical computations  
 C) NumPy is a library used for machine learning  
 D) NumPy is a library used for data visualization
32. Which of the following is an example of supervised learning in machine learning?  
 A) Clustering  
 B) Decision tree  
 C) Reinforcement learning  
 D) Association rule learning
33. Which of the following is NOT a characteristic of big data?  
 A) Volume  
 B) Velocity  
 C) Veracity  
 D) Vulnerability
34. Which of the following is NOT an application of artificial intelligence?  
 A) Self-driving cars  
 B) Image recognition  
 C) Social media  
 D) Spam filtering
35. For  $S \rightarrow 0S1$  for  $\Sigma = \{0, 1\}^*$ , which of the following is wrong for the language produced?  
 A) Non regular language  
 B)  $0^n 1^n \mid n \geq 0$   
 C)  $0^n 1^n \mid n \geq 1$   
 D) None of the mentioned
36. Consider the languages  
 $L_1 = \{0^i 1^j \mid i \neq j\}$ .  
 $L_2 = \{0^i 1^j \mid i = j\}$ .  
 $L_3 = \{0^i 1^j \mid i = 2j + 1\}$ .  
 $L_4 = \{0^i 1^j \mid i \neq 2j\}$   
 A) Only  $L_2$  is context free  
 B) Only  $L_2$  and  $L_3$  are context free  
 C) Only  $L_1$  and  $L_2$  are context free  
 D) All are context free

37. If L and L' are recursively enumerable, then L is  
 A) regular B) context-free  
 C) context-sensitive D) recursive
38. Which of the following statements is/are FALSE?  
 1. For every non-deterministic Turing machine, there exists an equivalent deterministic Turing machine.  
 2. Turing recognizable languages are closed under union and complementation.  
 3. Turing decidable languages are closed under intersection and complementation.  
 4. Turing recognizable languages are closed under union and intersection.  
 A) 1 and 4 only B) 1 and 3 only  
 C) 2 only D) 3 only
39. All recursively enumerated language is a set of \_\_\_\_\_.  
 A) closed under complementation.  
 B) closed under intersection.  
 C) a subset of the set of all recursive languages.  
 D) an uncountable set.
40. Which of the following option is incorrect?  
 A) An unambiguous grammar has same leftmost and rightmost derivation  
 B) An LL(1) parser is a top-down parser  
 C) LALR is more powerful than SLR  
 D) An LL(1) parser is a bottom-up parser
41. One of the purposes of using intermediate code in compilers is to  
 A) make parsing and semantic analysis simpler.  
 B) improve error recovery and error reporting  
 C) increase the chances of reusing the machine-independent code optimizer in other compilers.  
 D) make lexical and semantic analysis
42. \_\_\_\_\_ is the most general phase structured grammar.  
 A) Regular B) Context free  
 C) Context sensitive D) Compiler free
43. Compiler translates the source code to  
 A) Machine code & Binary Code  
 B) Program & Computer code  
 C) Number & Binary Code  
 D) System code
44. A computer system has 6 tape drives, with 'n' processes competing for them. Each process may need 3 tape drives. The maximum value of 'n' for which the system is guaranteed to be deadlock free is  
 A) 4 B) 3  
 C) 2 D) 1



55. The access point (AP) in a wireless LAN is used for  
A) device that allows wireless devices to connect to a wired network  
B) wireless devices itself  
C) both device that allows wireless devices to connect to a wired network and wireless devices itself  
D) device that allows wired devices to connect to a wired network
56. A wireless network interface controller can work in \_\_\_\_\_.  
A) infrastructure mode  
B) ad-hoc mode  
C) Infrastructure mode and ad-hoc mode  
D) WDS mode
57. What is WPA?  
A) wi-fi protected access  
B) wired protected access  
C) wired process access  
D) wi-fi process access
58. What is maintained by statefull firewall in active connections?  
A) Routing Table  
B) Bridging Table  
C) State Table  
D) Connection Table
59. What is a MAC address?  
A) A unique identifier assigned to a network interface controller  
B) A protocol used for transmitting data over a network  
C) A set of rules governing the exchange of data between devices  
D) A type of cable used to connect devices in a network
60. Which of the following is NOT an authentication factor?  
A) Something you know  
B) Something you have  
C) Something you are  
D) Somewhere you are
61. Which of the following is NOT a type of malware?  
A) Virus  
B) Worm  
C) Trojan  
D) Firewall
62. Which of the following encryption algorithms is symmetric?  
A) RSA  
B) AES  
C) Diffie-Hellman  
D) Elliptic Curve
63. Which of the following is NOT a common vulnerability assessment technique?  
A) Penetration testing  
B) Vulnerability scanning  
C) Network sniffing  
D) Code review
64. Which of the following is NOT a common network security protocol?  
A) SSL/TLS  
B) IPSec  
C) SSH  
D) DNS
65. What is the definition of entropy in information theory?  
A) The amount of randomness in a system  
B) The amount of order in a system  
C) The amount of energy in a system  
D) The amount of information in a system

66. Which of the following is a symmetric-key encryption algorithm?  
 A) RSA  
 B) AES  
 C) Diffie-Hellman  
 D) ElGamal
67. What is the purpose of a one-time pad in cryptography?  
 A) To generate random keys for encryption  
 B) To authenticate users in a system  
 C) To securely exchange keys between parties  
 D) To provide perfect secrecy for a message
68. What is the Shannon entropy of a message that has only one possible outcome?  
 A) 0  
 B) 1  
 C) Infinity  
 D) Cannot be determined
69. If  $p$  is prime, then  $(p-1)! \equiv -1 \pmod{p}$ . This is the statement of :  
 A) Fermat's theorem.                      B) Wilson's theorem.  
 C) Euler's theorem.                        D) Euclid's theorem.
70. The quadratic congruence  $x^2 \equiv -1 \pmod{p}$ ,  $p$  is a prime, has a solution if  
 A)  $p \equiv 1 \pmod{p^2}$                       B)  $p \equiv 1 \pmod{4}$   
 C)  $p \equiv -1 \pmod{4}$                       D)  $p \equiv 1 \pmod{4x}$
71. The solution of the system:  
 $x \equiv 3 \pmod{6}$ ,  
 $x \equiv 5 \pmod{7}$ ,  
 $x \equiv 2 \pmod{11}$     is:  
 A)  $x \equiv 9 \pmod{462}$                       B)  $x \equiv 420 \pmod{462}$   
 C)  $x \equiv 231 \pmod{462}$                       D)  $x \equiv 453 \pmod{462}$
72. Find  $\tau$  and  $\sigma$  for  $n = 3000$ , where for each positive integer  $n$ ,  $\tau(n)$  is the number of positive divisors of  $n$  including 1 and  $\sigma(n)$  is the sum of these divisors.  
 A) 9, 217                                      B) 32, 2340  
 C) 32, 9360                                    D) 9, 2340



73. If  $f = \{2, 3\}$  and  $g = \{4, 5\}$  are two permutations on  $\{1, 2, 3, 4, 5\}$ , then  $fg$  is:

A)  $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 2 & 3 & 4 & 5 & 1 \end{pmatrix}$

B)  $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 1 & 3 & 4 & 5 & 2 \end{pmatrix}$

C)  $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 1 & 3 & 2 & 5 & 4 \end{pmatrix}$

D)  $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 1 & 2 & 3 & 4 & 5 \end{pmatrix}$

74. If  $G$  is a finite group, then for every  $a \in G$ , the order of  $a$  is:

A) Finite

B) Infinite

C) Zero

D) None of the above

75. If in a ring with unity  $(xy)^2 = x^2y^2 \forall x, y \in R$ , then

A)  $R$  is a commutative ring.

B)  $R$  is an integral domain.

C)  $R$  is a field.

D) None of the above

76. Given field  $F$  and the set  $M$  of all  $2 \times 2$  matrices of the form  $\begin{bmatrix} a & b \\ 0 & 0 \end{bmatrix}$  for  $a, b \in F$ , then

Statement I:  $M$  is a sub ring of  $F$ .

Statement II:  $M$  is right ideal in  $F$

Statement III:  $M$  is left ideal in  $F$ .

Statement IV:  $M$  is right ideal but not left ideal in  $F$ .

Which option is correct?

A) Only statements I and III are true.

B) Only statements I, II and III are true.

C) Only statements I, II and IV are true.

D) All the statements are true.





85. The question given below consists of a statement, followed by two arguments numbered I and II. You have to decide which of the arguments is a 'strong' argument and which is a 'weak' argument:

Statement: Should India encourage exports, when most things are insufficient for internal use itself?

Arguments: I - Yes. We have to earn foreign exchange to pay for our imports.

II - No. Even selective encouragement would lead to shortages.

- A. Only argument I is strong  
B. Only argument II is strong  
C. Either I or II is strong  
D. Neither I nor II is strong

86. Read the below passage carefully and answer the question:

At a small company, parking spaces are reserved for the top executives: CEO, president, vice president, secretary, and treasurer with the spaces lined up in that order. The parking lot guard can tell at a glance if the cars are parked correctly by looking at the colour of the cars. The cars are yellow, green, purple, red, and blue, and the executives' names are Alice, Bert, Cheryl, David, and Enid.

- The car in the first space is red.
- A blue car is parked between the red car and the green car.
- The car in the last space is purple.
- The secretary drives a yellow car.
- Alice's car is parked next to David's.
- Enid drives a green car.
- Bert's car is parked between Cheryl's and Enid's.
- David's car is parked in the last space.

Who is the secretary?

- A. Enid  
B. David  
C. Cheryl  
D. Alice

87. Read the information given below and on the basis of the information, answer the question

There are five persons P, Q, R, S, and T. One is football player, one is chess player, one is hockey player. P and S are unmarried ladies and do not participate in any game. None of the ladies plays chess or football. There is a married couple in which T is the husband. Q is the brother of R and is neither a chess player nor a hockey player.

Who is the football player?

- A. Q  
B. R  
C. S  
D. T





